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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,700	11/09/2005	Nobuyuki Negishi	500.45008X00	1389
20457 7590 06/12/2007 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER DEO, DUY VU NGUYEN	
			ART UNIT 1765	PAPER NUMBER
			NOTIFICATION DATE 06/12/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

officeaction@antonelli.com
dprater@antonelli.com
tsampson@antonelli.com

Office Action Summary	Application No. 10/531,700	Applicant(s) NEGISHI ET AL.	
	Examiner Duy-Vu N. Deo	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-6,9-11 and 15-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-20 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6 and 11 is/are rejected.
- 7) ☒ Claim(s) 9 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4/18/05, 11/9/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Noguchi et al. (US 4,615,620).

Noguchi describes a method for measuring the depth of holes of a pattern on a semiconductor substrate comprising: etching a plurality of holes on the substrate with a plasma using a HF power (col. 13, line 14-25); irradiating white light (claimed continuous spectrum) in an etch portion (claimed hole portion) and unworked portion (claimed flat portion) and measuring the intensity of interference light with variable wavelength (claimed measuring the amount of shift along the direction of wavelength axis between the reflectivity of detection light for the flat portion and the reflectivity of detection light for the hole portion) and calculating the depth of the hole portion based on the data collected from the intensity of interference light with variable wavelength, the hole pattern, and the film thickness (col. 3, line 3-20; col. 7, line 14-30; col. 12, line 30-col. 13, line 10; col. 14, line 15-24).

Referring to claim 11, the limitation describing the plasma etching system is not considered to have patentable weight because this is method claim and the steps cited do not correspond to the cited components of the system.

Referring to claim 2, the light enters the substrate surface at either right angles or the incident light does not always need to be perpendicular to the substrate (col. 10, line 11-32).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4, 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi as applied to claim 1 above, and further in view of Clevenger et al. (US 6,268,293).

Unlike claimed invention, Noguchi doesn't describe the steps of etching an insulating film to form a plurality of holes and burying a metal in the holes. However, these steps are well known to one skilled in the art at the time of the invention was made as shown here by Clevenger. The method further includes measuring the hole depth (col. 1, line 40-60; col. 2, line 62-col. 3, line 5). One skilled in the art at the time of the invention was made would find it obvious to form a semiconductor device further in light of Clevenger because these steps would form a damascene structure.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1, 2, 4, 5, 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Referring to claim 1, it is unclear where in the specification teaching the limitation “during or after the hole forming step, irradiating the light having a continuous spectrum in a flat portion and a hole portion of the main surface of the semiconductor wafer and measuring the amount of shift along the direction of the wavelength axis between the reflectivity of detection light for the flat portion and the reflectivity of detection light for the hole portion; and calculating the depth of the hole portion based on the wavelength axis direction shift amount, film thickness data and hole pattern.”

Referring to claim 5, it is unclear where in the specification teaching the limitation “a step of irradiating light having a continuous spectrum on a flat portion and a hole portion of the film, measuring a change in the wavelength axis direction shift amount between the reflectivity of detection light in the flat portion and the reflectivity of detection light in the hole portion and calculating the depth of forming a plurality of holes through the hole portion based on the measurement result thereby to control the operation to form a plurality of holes through the insulating film of measurement during the step of (2).”

Claim Objections

7. Claims 9, 10 are objected to because of the following informalities: they depend on claim 8, which is already canceled. Appropriate correction is required.

Allowable Subject Matter

8. Claims 15-20 are allowed because applied prior art doesn't teach or suggest the step of the method comprising a step of measuring an electrostatic capacitance of a flat portion and a hole portion of the water-wafer on the main surface of the semiconductor wafer by the etching depth inspection unit after forming the holes, and a step of comparing the electrostatic capacitance acquired from the flat portion and the hole portion with each other and determining the difference between a measurement value of the electrostatic capacitance of the flat portion and a measurement value of the electrostatic capacitance of the hole portion.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duy-Vu N. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Duy-Vu N Deo
Primary Examiner
Art Unit 1765



6/6/07